FACT SHEET

L-921

Tree Killers . . .

Pine Bark Beetles

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More pines are killed by bark beetles than by any other group of insects. All common pines in Eastern Texas are attacked by the beetles. Although they usually breed in forest trees, pines around yards and homes are also selected for breeding places.

DESCRIPTION AND HABITS

Five species of bark beetles are responsible for most of the damage to pines—the southern pine beetle (*Dendroctonus frontalis* Zimm.), the three southern *Ips* engraver beetles (*Ips avulsus* Eich., *Ips calligraphus* Germ., and *Ips grandicollis* Eich.) and the black turpentine beetle (*Dendroctonus terebrans* Oliv.).

Bark beetles spend most of their lives beneath the bark of their host trees where adult beetles chew out tunnels, or *galleries*. Upon hatching from eggs laid along the gallery sides, the young larvae bore away at right angles. When fully developed, the larvae transform to pupae and then to adult beetles. They chew through the bark and fly to attack other trees. The tree's death results from girdling by adults in forming the egg galleries, by larval feeding or tunneling and by fungi brought into the tunnels by the attacking beetles.

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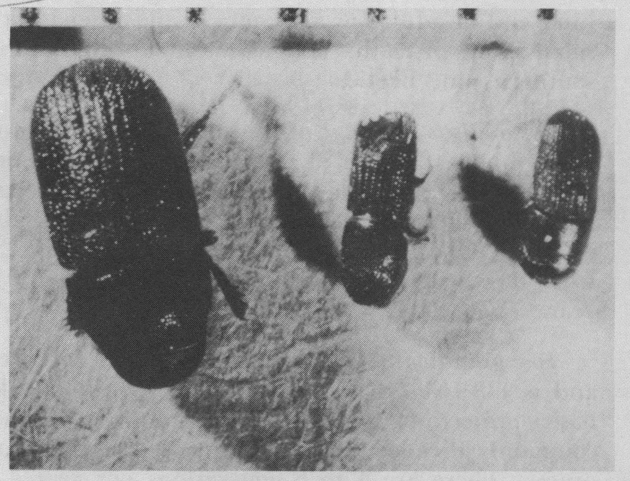

Fig. 1. Three species of pine bark beetles, left to right: **Dendroctonus frontalis, Ips calligraphus, Dendroctonus terebrans.** Note the concave, truncate, and toothed hind end of the **Ips** beetle.

Southern pine beetle

This is the most destructive insect pest of pines in the South. Outbreaks may cover many acres and kill thousands of trees. Pines of all sizes are attacked, and healthy, vigorous trees are killed by this beetle during epidemics.

The brown or black adult beetle is from 3/32 to 3/16 inch long. Its hind end is convex and rounded, in contrast to the concave, truncate and

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toothed hind end of the *Ips* beetle (See figure 1). Winding, "S"-shaped egg galleries are made by adult beetles beneath the dry outer bark (See figure 2). Larvae are white and legless with glossy, reddish-brown heads; their bodies are wrinkled and curved. Under optimum conditions, the entire life cycle may be completed in 30 days, and 5 to 7 generations may occur each year.

Ips engraver beetles

The three species of engraver beetles are similar in habits and life histories, but can be readily distinguished by their size and the number of projections or teeth on their hind end. *Ips* beetles are attracted to trees weakened or injured by some natural or man-caused injury. Lightning-struck trees are especially attractive to the beetles and often are the center of spread to nearby trees. Normally they attack and kill only one or a few trees in a given spot, but if conditions are satisfactory, hundreds of trees may be killed.

In contrast to the "S"-shaped galleries made by southern pine beetles, adult *Ips* beetles make either "H"- or "Y"-shaped tunnels (See figure 3). The hind end of adult *Ips* are concave and armed with small spines or teeth. Larvae resemble those of the southern pine beetle.

Ips avulsus, smallest of the engravers, is a brown beetle about the size of the southern pine beetle. There are 8 projections (4 on each side) on its rear end. It prefers to attack the upper stem and limbs of trees. One generation may be completed in 20 to 30 days with 8 to 10 generations occurring each year.

Ips grandicollis is the medium-sized engraver and is 1/8 to 3/16 inch long. This brown beetle has 5 projections at each side of its rear end and commonly invades the middle and upper trunk of pines. There are 4 to 6 generations per year.

Ips calligraphus has 6 projections at the rear of each wing cover and is the largest of the three beetles—from 3/16 to 1/4 inch long. It tunnels in the lower parts of the main stem. There may be 4 or 5 generations per year.

Black turpentine beetle

Trees with the bark injured or burned, trees with roots damaged by machinery or compaction, and fresh stumps are attractive to the black turpentine beetle. Attacks usually are limited to the lower 6 to 8 feet of the trunk. Turpentine beetles

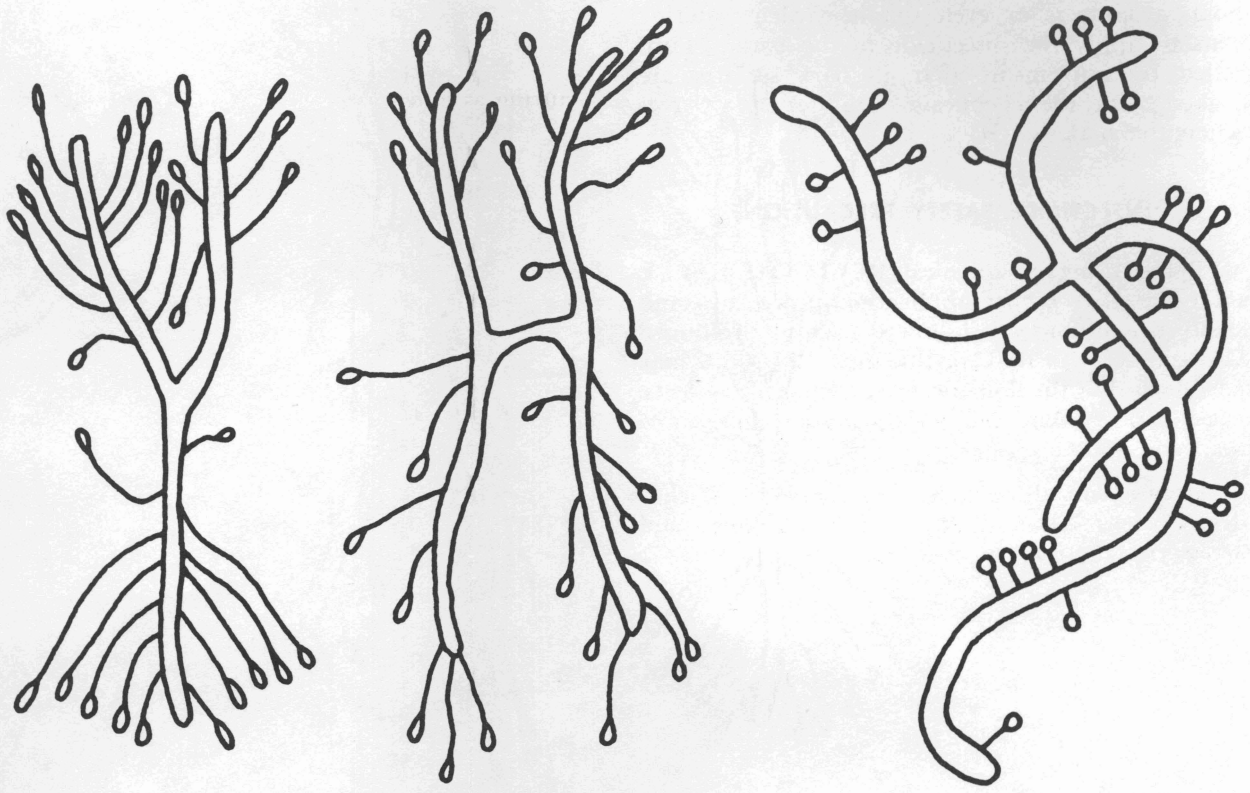

Fig. 2. Left to right: Winding, "S"-shaped egg galleries of the southern pine beetle, and "Y" or "H"-shaped egg galleries of **Ips** engraver beetles.

do not attack a tree in such large numbers as do the other bark beetles; therefore, the tree may recover from their attacks.

This black beetle is the largest pine bark beetle in the South, ranging from 1/4 to 3/8 inch in length. The hind end is convex as in the southern pine beetle. Egg galleries extend downward from the point of entrance, winding slightly. Large, white, legless larvae feed in groups next to the egg galleries, in contrast to the separate larvae feeding of other Texas bark beetles. Two generations normally are completed in a year.

Inter-relationships of bark beetles

A tree may be killed by the attacks of a single species of bark beetles. Commonly, however, two or more species attack the same tree to bring about its death. *Ips* beetles may be attracted to trees initially attacked by southern pine beetles and vice versa. Egg galleries of different bark beetle species may be intermixed in the same section of a host tree.

SIGNS OF ATTACK

Although the different bark beetles have different habits and life histories, symptoms exhibited by infested trees are similar for all species.

Trees heavily infested with bark beetles die rapidly. Needles begin to discolor near the tree top, and fading progresses rapidly over the entire tree crown. Foliage color progresses from yellow-green, to yellow, to yellow-red.

Even before needles begin to fade, attacks are indicated by reddish-brown boring dust lodged in bark crevices and around the base of the tree. Small masses of pine resin known as "pitch tubes" usually are scattered over the bark surface. Varying in color from white to reddish, these pitch tubes mark the point where individual beetles have bored into the living tree. Positive identifications of bark beetles infestations are made by removing a square of bark. Exposed on its inner surface and on the outer wood surface of the tree are the characteristic gallery patterns of the bark beetles.

PREVENTION OF INFESTATION

Trees heavily attacked by *Ips* beetles and southern pine beetles are doomed to die. Therefore, practices to prevent the beetles from successfully attacking are very important. In residential areas, practices can begin during construction of a new home. Heavy traffic by trucks, equipment and workers compacts the soil in the root zone, disrupting water and air movement, and reducing the vigor of the tree. Equipment may damage the bark directly. Raise or lower the soil grade around a tree carefully to prevent drastic alterations in the normal soil water movement patterns. Tree protection practices are given in Texas Agricultural Extension Service publication MP-788, *Protection of Existing Landscape Trees.*

In established yards, proper watering and fertilization help reduce the possibility of bark beetle infestation. During periods of dry weather, water trees often. Apply fertilizer, such as 10-8-6 formulation, at 2 pounds for each inch in diameter of the tree trunk. Apply only 1 pound of the formulation per inch to trees less than 6 inches in diameter.

Trees may be protected for 3 to 6 months by spraying with chemicals. Cover completely the main trunk between ground-line and the first branches with a benzene hexachloride (BHC) or lindane spray until the solution runs down the bark crevices. Begin spraying at the uppermost point and work to the base of the tree. Mix chemicals in water or No. 2 fuel oil. Use water emulsions containing a spreader-sticker for better penetration and adherence of the insecticide to the bark. Lindane is a highly refined formulation of BHC and lacks the musty odor of BHC.

CONTROL OF BARK BEETLES

Predators, parasites and diseases take their toll of bark beetles but cannot be relied upon to stop infestation of individual trees or small groups of

Table 1. Dilution of Insecticides

Insecticide to be used for:	Amount of 12% BHC emulsifiable concentrate required*
Southern pine beetles **Ips** engraver beetles Black turpentine beetles	½ gal. concentrate in 12 gals. of No. 2 fuel oil or water 1 gal. concentrate in 12 gals. of No. 2 fuel oil or water
Prevention of bark beetle attack on uninfested trees	1 gal. concentrate in 12 gals. of No. 2 fuel oil or water

*If using concentrates in which the percentages of active ingredients differs from these percentages, mix proportionately with the oil or water.

trees. Remove or spray trees that contain bark beetle larvae and adults to prevent infestation of other pines. Under forest conditions, use salvage cutting as much as possible. This method has two advantages—the timber owner may recover some of his monetary losses, and the natural complex of predators and parasites is not disrupted by insecticide applications.

In home yards, cut and burn infested pines, or spray them with BHC or lindane. Protect surrounding, uninfested trees from attack with the same insecticides (See table 1).

Power sprayers with extension connectors are best for spraying standing trees. If these are not available, a hand pressure type sprayer of 1½ to 3 gallon capacity is suitable. High pressure sprayers are not needed where the insecticide is being applied to felled trees. Use hand pressure sprayers, hose-on sprayers or even simple garden watering cans to apply the insecticide to the bark. Turn felled trees to insure that all bark surfaces are soaked with the chemicals. Do not spray trees when the bark is wet.

INSECTICIDE SAFETY PRECAUTIONS

Before using any chemical, READ THE LABEL to insure that proper application procedures and safety precautions are followed. Avoid prolonged skin contact with BHC or lindane. Chemicals may be absorbed by the skin and produce harmful effects. Wash exposed skin areas with generous amounts of soap and water.

Store chemicals in locked cabinets out of children's reach. Clean all application equipment and accessories thoroughly after use.

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